Loaded Gelled Bipropellants for Optimized Performance, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

The focus of this program is the development and validation of formulations, and development methodologies, for optimizing high-performance particulate-loaded bipropellant gels to maximize specific thrust, taking into account not only composition but the effect of particle size and properties on maximum achievable combustion performance. The approach quantifies the maximum attainable loading for given particle size, and the subsequent tradeoff with impacts on combustion efficiency due to incomplete solid phase burnout of larger particles, and conversely the degree of pre-oxidation of smaller particles. The method also allows the physical properties of the gel to be optimized. This improves the competitiveness of gelled bipropellants with equivalent liquids, while incorporating the safety and handling advantages of gels. ERGC Corporation has worked to address this solicitation objective in cooperation with subcontractor Northrop Grumman Space and Technology (NGST) Propulsion Systems, the leader in gel propellant technology. The Phase II program will continue experimental refinement and property testing of gel formulations (including freeze/thaw cycling to ensure properties are maintained under projected mission conditions), employ combustion modeling to determine those formulations expected to provide the best actual performance, and conduct engine tests to validate the performance of the most promising candidates.

Primary U.S. Work Locations and Key Partners

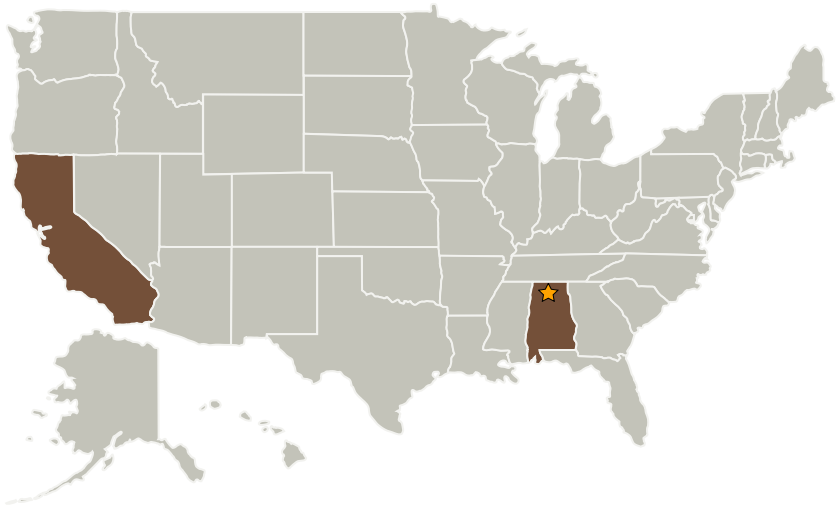

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Energy and Environmental Research Corp	Supporting Organization	Industry	Irvine, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.6 Gels